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IFISC Colloquium

Speaker: **Professor Michael Batty**

Title: **Modelling Disruption in Large Scale Transit Systems**

Date and Time: Thursday, 11. October 2012, 15:00

Place: IFISC Seminar room

About the speaker:

Michael Batty is Bartlett Professor of Planning at University College London, chairing the Centre for Advanced Spatial Analysis (CASA). Previously he was Professor of City and Regional Planning in the University of Cardiff and Director of the NSF National Center for Geographic Information and Analysis (NCGIA) in the State University of New York at Buffalo. His research work involves the development of computer models of cities and regions. He has published many books and articles on this topic, e.g. *Cities and Complexity* for which he was awarded the Alonso Prize of the Regional Science Association in 2011. His most recent edited book is *Agent-Based Models of Geographical Systems* (2012). He is editor of the journal *Environment and Planning B*. More details about his work and the work of his group are accessible via http://www.casa.ucl.ac.uk/ and http://www.complexcity.info. Michael Batty was a Member of the Advisory Panel on Public Sector Information (APPSI) that reports to the Minister of Justice and he chairs the ERSC Census Advisory Committee that oversees the data units in the UK university system. He was made a Fellow of the British Academy in 2001 and elected as a Fellow of the Royal Society (FRS) in 2009. Recently, he received the UCGIS Research Prize in 2012. He was awarded the honor of Commander of the Order of the British Empire in the Queen's Birthday Honours in 2004 for 'services to geography'.

Abstract:

We are working with a very large data set of the volumes of entries and exits at tube stations by passengers using the London tube and overground rail networks. The data set is from the smart cards – Oyster cards – that travellers employ to travel on the system. The data is time stamped by the second at which the traveller enters or leaves the system and the set we are currently working with has about one billion records over about 6 months. There are around 4-5 million tap in and tap outs per day. What we are doing is essentially disrupting the networks – closing stations, lines and so on- so that we can examine the diffusion of traffic and the build-up of congestion at stations when such closures take place. We have two models, first a model of the network that we simulate using graph theory and second a model of the same network on which flows are allocated. We are measuring the accessibility of stations using various notions of centrality and these indices change of course when disruptions occur. Our first analysis is based on betweenness centrality and the second on a flow measure of the same kind of centrality. We explore various case studies of how the disruptions affect the network, first in terms of the infrastructure and then in terms of flows. Our analysis is preliminary but suggestive of how we might explore this problem in greater detail, linking the analysis to diffusion across coupled networks.

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TV

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http://ifisc.uib-csic.es/live.php